

**What is claimed:**

1. A semiconductor element, substantially comprising:
  - a substrate,
  - an underlayer, epitaxially grown on the substrate, made of a first semiconductor nitride including at least one element selected from the group consisting of Al, Ga and In, the dislocation density of the underlayer being set to  $10^{11}/\text{cm}^2$  or below, the crystallinity of the underlayer being set to 90 seconds or below in full width at half maximum of X-ray rocking curve at (002) reflection,
  - a first conductive layer of a first conduction type, epitaxially grown on the underlayer, made of a second semiconductor nitride including at least one element selected from the group consisting of Al, Ga and In, the dislocation of the first conductive layer being set to  $10^{10}/\text{cm}^2$  or below, the crystallinity of the first conductive layer being set to 150 seconds or below in full width at half maximum of X-ray rocking curve at (002) reflection,
  - a second conductive layer of the first conduction type, epitaxially grown on the first conductive layer, made of a third semiconductor nitride including at least one element selected from the group consisting of Al, Ga and In, the dislocation of the second conductive layer being set to  $10^{10}/\text{cm}^2$  or below, the crystallinity of the second conductive layer being set to 90 seconds or below in full width at half maximum of X-ray rocking curve at (002) reflection,
  - a third conductive layer of a second conduction type opposite to the first conduction type, epitaxially grown on the second conductive layer, made of a fourth semiconductor nitride including at least one element selected from the group consisting of Al, Ga and In, the dislocation of the third conductive layer being set to  $10^{10}/\text{cm}^2$  or below, the crystallinity of the third conductive layer being set to 150 seconds or below in full width at half maximum of X-ray rocking curve at (002) reflection, and
  - a fourth conductive layer of the first conduction type, epitaxially grown on the third conductive layer, made of a fifth semiconductor nitride including at least one element selected from the group consisting of Al, Ga and In, the dislocation of the fourth conductive layer being set to  $10^{10}/\text{cm}^2$  or below, the crystallinity of the

fourth conductive layer being set to 150 seconds or below in full width at half maximum of X-ray rocking curve at (002) reflection.

2. A semiconductor element as defined in claim 1, wherein the underlayer is formed at 1100°C or over by a MOCVD method.

3. A semiconductor element as defined in claim 2, wherein the underlayer is formed at a temperature within 1100-1250°C.

4. A semiconductor element as defined in claim 1, wherein the substrate is made of a sapphire single crystal having a surface nitride layer on the main surface of the crystal, and the underlayer is formed on the main surface via the surface nitride layer.

5. A semiconductor element as defined in claim 1, wherein the material composition of the first semiconductor nitride constituting the underlayer is varied continuously or stepwisely from the substrate toward the conductive layer.

6. A semiconductor element as defined in claim 1, wherein the warp of the semiconductor element is 100  $\mu$  m or below per 5 cm length.

7. A heterojunction bipolar transistor comprising a semiconductor element, an emitter electrode, a collector electrode and a base electrode which are provided on the semiconductor element.